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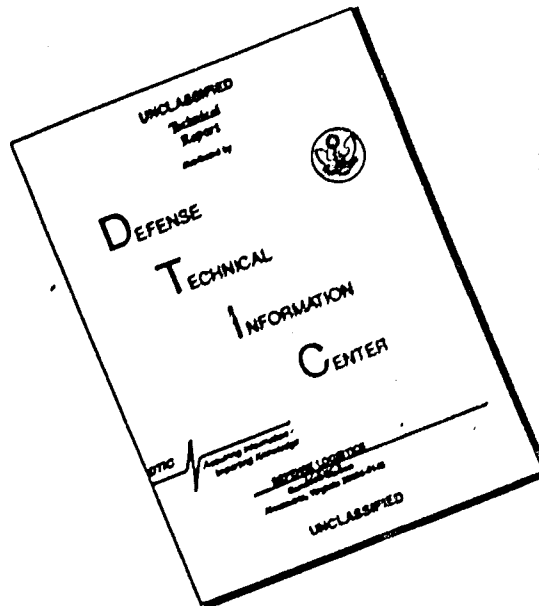
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HEADQUARTERS  
20TH ENGINEER BATTALION (CBT)  
APO San Francisco 96312

EGACBD-CO

15 May 1966

SUBJECT: Operational Report on Lessons Learned for Quarterly Period  
Ending 30 April 1966, Reports Control Symbol CSGPO-28(R1)

THRU: Commanding Officer  
35th Engineer Group (Construction)  
APO San Francisco 96312

THRU: Commanding General  
18th Engineer Brigade  
APO San Francisco 96307

TO: Assistant Chief of Staff for Force Development  
Department of the Army (ACSFOR-DA)  
Washington, D.C. 20310

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Section I. Significant Organization Activities:

1. Narrative Summary of Activities.

a. POM and Deployment. The 20th Engineer Battalion (Cbt) was alerted for overseas movement on 3 September 1965 by Message DA 729668, Warning Message, Deployment to SEA (U), 011610Z September 1965. When alerted, the battalion was heavily committed with one line company at Camp Drum, New York on road construction, one reinforced squad at Camp Edwards, Massachusetts on range renovation, 90 individuals on special duty and TDY in support of Fort Devens, Massachusetts and Camp Drum, New York and the remainder of the battalion engaged in construction of range facilities at Fort Devens, Massachusetts.

The battalion was then short a total of 123 personnel, a result of heavy levy actions taken to fill units previously alerted.

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On receipt of alert notification, all personnel were recalled from special duty and TDY. The range projects at Fort Devens were transferred to the 86th Engineer Battalion (Cbt) from Fort Dix, New Jersey.

Immediate emphasis was placed on developing an intensified combat training program within the guidelines of ICTP8 (5-35D). The program was modified to seven weeks due to the limited time available prior to deployment. The major consideration in the development of such a program was the balance of time available versus the personnel and equipment available. Deployable strength of the battalion when training commenced on 20 September 1965 was approximately 30% of full TOE strength, with the majority of filler personnel scheduled to arrive during the third and fourth week of training. Emphasis was initially placed on cadre-type (key NCO) training with this emphasis shifting as rapidly as possible to unit training. Such action was necessary due to the projected late arrival of filler personnel on or after 10 October 1965. Lacking specific guidance on probable destination missions, the greater part of this unit training was geared to combat and combat support operations with emphasis on counterinsurgency. In this regard, FM 31-73 and USCONARC Pamphlet 350-16, Leader's Guide for Operations in Southeast Asia, dated August 1965, proved particularly valuable as references. During the fifth week of the modified ICTP a three day battalion FTX was conducted providing the organization a valuable opportunity to tactically employ as a unit and undertake combat, combat support and construction missions. Continued arrival of filler personnel throughout the training period necessitated devoting seventh week training primarily to POR qualification and critical tactical training geared to operations in Southeast Asia. As of 30 November 1965, 99.8% of assigned deployable personnel were POR qualified.

Major emphasis was placed early after receipt of the alert order to inventory, repair and/or requisition all supplies and equipment required for deployment. During the period 10 to 30 October 1965, a total of 108 vehicles and major items of equipment were turned-in and about 100 were received. A significant shortage of organizational equipment persisted through the seventh week of training and included such major items as 15 each 2½ ton trucks and all radio mounts.

Upon receipt of the Movement Directive on 12 October 1965 and Movement Order on 14 October 1965, follow-up coordination was made with Headquarters, Fort Devens, to expedite the receipt of personnel fillers, vehicles and equipment. Task schedules, relating to each staff functional area, were established for internal control of all organization actions required to meet the Equipment Readiness Date of 18 November 1965 and the Personnel Readiness Date of 1 December 1965. In view of the short

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time remaining prior to PRD, a phased personnel pre-deployment leave schedule was established from 26 October 1965 to 29 November 1965 which granted each individual ten days leave. This schedule permitted all personnel to take leave, while providing at the same time sufficient personnel in garrison to prepare organizational equipment for movement and allow for the orderly closeout of administrative and property accounts at Fort Devens. Port Calls for equipment and personnel were received on 21 November 1965 and 24 November 1965 respectively. The majority of equipment and supplies were outloaded at the Boston Army Terminal on the USNS Lt James E. Robinson which sailed on 5 December 1965. The remainder of the equipment was shipped by rail to Oakland Army Terminal, Oakland, California, where it was loaded on the MSTs Morgantown Victory for shipment to Vietnam. On 8 and 9 December 1965, the main body of the battalion departed Fort Devens, Massachusetts via various commercial and military aircraft for Oakland Army Terminal for loading on the USNS William Weigel. The ship departed for Vietnam on 9 December and arrived at Cam Ranh Bay, Vietnam on 1 January 1966. The Advance Party/Rear Detachment of the 20th left Fort Devens, Massachusetts on 14 December 1965 via C-130 aircraft and arrived in South Vietnam on 18 December 1965.

Upon deployment from CONUS the 20th Engineer Battalion (Cbt) had operational readiness condition ratings of C-1 in all major areas. Although C-1 in personnel, the shortage of 24 radio operators out of 27 authorized was considered critical to future combat support operations. During the pre-deployment period of POM, the organization was given a CMI, was provided a special unit readiness inspection by a Department of the Army Inspector General team and was periodically inspected for readiness posture by the Commanding General, First Army. Satisfactory ratings were obtained by all units and the organization found combat ready.

## b. Employment.

(1) Assignment. Upon arrival in Cam Ranh Bay, Republic of Vietnam, the battalion was attached for all purposes to the 35th Engineer Group (Construction), by General Order Number 5, Headquarters, 18th Engineer Brigade, APO US Forces 96307, dated 10 January 1966. Effective date of attachment was 1 January 1966.

(2) Mission. The primary mission of the battalion has been the construction of administrative, logistical and operating facilities for an Army Aviation complex within the Dong Ba Thin Permanent Military Area (see Inclosures 1 and 2).

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(3) Attachments and Detachments. General Order Number 4, Headquarters, 35th Engineer Group (Construction), attached the 513th Engineer Company (Dump Truck)(-) and the 584th Engineer Company (Light Equipment)(-) to the 20th Engineer Battalion (Combat) effective 15 January 1966. The 584th Engineer Company (LE) then had one platoon attached to the 62d Engineer Battalion (Const) at Phan Rang. This platoon was subsequently released to its parent unit on 30 March 1966. The 513th Engineer Company (DT) then had one platoon attached to the 937th Engineer Group at Qui Nhon; this detachment from the parent unit remains in effect.

(4) Unit Operations. During the first three weeks of the period (1 January - 22 January 1966) the battalion activities centered on staging in and transiting the Port of Cam Ranh, developing its initial (interim) cantonment near Dong Ba Thin to Standard 2, receiving and deprocessing organizational impedimenta which had been separately deployed and actively initiating work on tasks assigned in Dong Ba Thin. The command (Advance Party) assumed operational control of the 584th and 513th Engineer Companies on 28 December 1965, directing the continuation of work initiated during the last quarter of CY 65 by Company C, 65th Engineer Battalion (Infantry Division) then at Dong Ba Thin. This work involved assumption of responsibilities for six outstanding design and construct directives, supporting construction of the Dong Ba Thin Military Complex (of which one was nearly complete and the remainder being not yet started or just initiated), and two equipment support and work directives supporting the 2d ROK Marine Brigade (of which both were nearly complete). During the major portion of the reporting period the entire organization was heavily committed to around-the-clock construction operations in the Dong Ba Thin Military Complex. Approximately 11% of the total troop effort and 6% of the equipment effort were committed to other tasks, which included preparation of bridge approaches (float bridge) at My Ca, construction for the ROK 2d Marine Brigade Headquarters, road maintenance (My Ca to Dong Ba Thin), engineer technical assistance to the ARVN Special Forces Training Center, and detailed route reconnaissance of QL-1 from Phan Rang to Ninh Hoa. Nine additional design and construct directives and three additional work directives were received during the period. Of the total projects assigned, five design and construction directives and five work directives became inactive by virtue of the specified work having been accomplished.

## 2. Significant Functional Activities.

a. Organization. The 20th Engineer Battalion (Cbt) is organized under TOE 5-35D with Change 1. The 513th Engineer Company (DT) is organized under TOE 5-124D with Change 4, while the 584th Engineer Company (LE) is organized under TOE 5-54D with Change 5. Several significant

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changes have been required in the existing structure to adequately support a construction mission. These changes have involved augmentations of various sections from existing assets as follows: augmentation of Battalion S-3 (to provide engineering and additional drafting and survey capability); augmentation of Battalion S-4 (to provide additional Class IV construction materials handling and control capability); and augmentation of Battalion Maintenance and unit motor sections (to provide a 24 hour unit and organizational maintenance capability).

## b. Personnel and Administration (Including Morale and Welfare).

The 20th Engineer Battalion (Cbt) arrived in the Republic of Vietnam on 1 January 1966 at full officer strength, however, only 528 enlisted men, of an authorized 586, were assigned. The principal shortage was 24 radio operators (MOS 05B20) out of 27 authorized. USCONARC had advised this battalion by Message PER-MPD-EL 418739, dated 28 October 1965, that 27 EM, MOS 05B20, would be furnished after arrival in country, but to date this critical shortage still exists and continues to jeopardize any combat support missions assigned the organization.

Under the existing Department of the Army policy at the time of deployment, the battalion included as deployable those personnel with at least 60 days remaining to ETS as of departure from CONUS. Consequently, in the first 60 days after arrival, from 1 January 1966 to 1 March 1966, three officers and 46 enlisted men departed for CONUS and separation from service.

The assigned enlisted strength of this battalion as of 30 April 1966 was 511, a deficit of 75 below authorized enlisted strength. A more significant representation of the troop assets of the battalion is the present for duty strength. This strength figure takes into account those personnel who are effectively lost to mission commitment and includes intransit in and out, TDY, sick, leave, etc. Present for duty strength governs current mission capabilities of the battalion. Present for duty enlisted strength on 30 April 1966 was 494, or a deficit of 90 from the battalion authorized enlisted strength. Most of these shortages are in the lower grades (E-3 and E-4) and represent a considerable loss to the battalion construction capability. The impact of this shortage on operations has been made all the more severe by the necessity 1) to augment from existing assets, as indicated in paragraph 2.a. above, and 2) to provide intensive on-the-job training for various skills, particularly in the equipment/vehicle operator area to support 24 hour operations.

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It is significant to note that officer shortages have been accommodated from assets available to 35th Engineer Group (Const). No officer replacements have been received at organizational level originally designated for either the 20th Engineer Battalion (Cbt) or the 584th Engineer Company (LE) during the reporting period. Four such officers are now known to be assigned and expected by early June 1966.

Disciplinary problems of the command (including attached companies) have been minimal, involving, during the reporting period, only nine courts-martial, of which six were summary courts. This is of particular significance in view of the proximity to and transient nature of indigenous civilians and villages, the intense pressure of daily work, disagreeable weather conditions and field living conditions.

An active command troop information and orientation program has been implemented, involving initial and periodic reorientation of all personnel in the history, customs and nature of the Vietnamese; the nature and objectives of the present United States commitment; the chain of command and command relationships; the importance and nature of the engineer mission within USARV; the history, mission and policies of this organization; duty hours, uniform requirements, curfew limitations, passes and leaves, grievances and rules of conduct; organizational and personal security; and facilities and services available.

A significant administrative burden has existed during the reporting period and continues to exist. Five daily, 12 weekly, 24 monthly, 10 quarterly, one semi-annual and one annual reports are provided by this organization on a recurring basis as indicated. This has been compounded by continuing changes in reporting requirements as well as numerous demands for "one time" reports. The impact at the unit level has been pronounced and adverse as unit commanders are frequently diverted from close and continuing supervision of their respective missions.

The battalion has published 32 memoranda implementing regulations and directives of higher authority as well as local policy. Standard operating procedures for security control, safety, construction and maintenance have been published and an organization field standard operating procedure prepared in draft.

The units of the organization are participants in the Cam Ranh Bay Central Post Fund and have each established unit fund councils.

Because of the heavy work load placed upon all personnel, it became difficult for each company to provide adequate barber services for its personnel. A battalion barber shop was established and two Vietnamese nationals were hired to staff it. In the hiring of the barbers and the operation of the shop, the requirements of AR 40-5 have

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been stringently enforced. The barbers are paid on a per haircut basis by the individual being serviced. Policies established in USARV Regulation 37-8 with regard to financial transactions with Vietnamese nationals are strictly adhered to. The service provided by these Vietnamese barbers has been excellent and has resulted in improved appearance of personnel.

In order to provide recreation and relaxation for personnel after duty hours, this battalion has established officer and NCO club facilities as annexes to the 10th Aviation Battalion Officers' and NCO Open Messes (Dong Ba Thin Military Complex). Company enlisted men's dayrooms have been established as part of the NCO annex. Although facilities are somewhat limited at this time, it is expected that continued improvement will be made in the future to provide more and better opportunities for installation recreational activity during off-duty hours.

On 20 February 1966 a movie account was established with the Army and Air Force Motion Picture Service, Pacific, Vietnam Regional Office. Movies are routinely shown in the battalion area five days a week. This has provided an excellent means for recreation during the evening hours and when initiated noticeably enhanced morale.

The Battalion Chaplain initiated a regular schedule of services for Catholic and Protestant faiths upon arrival in country. Under a chaplains exchange program with the 10th Aviation Battalion's Catholic Chaplain, religious services in both battalions have been adequately provided for both faiths. Religious coverage for members of the Jewish faith has been grossly inadequate due to the shortage of Jewish Chaplains in Vietnam. Services for Jewish personnel are held only once monthly in the Dong Ba Thin area.

The Battalion Chaplain makes a regular weekly visit to the 8th Field Hospital in Nha Trang and the Air Force Hospital at Cam Ranh Air Base to visit hospitalized personnel of the battalion.

The battalion chapel, which is located in a medium general purpose tent, is being steadily improved to provide the proper atmosphere for the conduct of religious services. Although lacking a qualified organist, the chaplain has obtained a tape recorder and religious music tapes which have proven to be quite satisfactory.

The morale of the battalion upon arrival in Vietnam was amazingly high. The men were enthusiastically looking forward to their new work and during the first four months have quantitatively and

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qualitatively exceeded expected capabilities. The considerable attention devoted to personal problems by commanders, the Battalion Chaplain and Medical Officer have done much to reduce the impact and tendency to magnify personal problems resulting from family separations.

## c. Intelligence and Security.

The combat intelligence requirements for the battalion have been negligible while engaged in construction activities. The battalion has been located in a relatively secure area and has been divorced from the normal combat intelligence activities required of an Engineer Combat Battalion. Nevertheless an active intelligence program has been maintained.

The battalion has developed an intelligence collection plan, suited to its needs and circumstances. Emphasis has been placed on identification of native construction materials, particularly rock, lateritic materials and coral. Considerable reconnaissance effort has been devoted to location of potential sources of fresh water in the immediate vicinity.

Detailed route reconnaissance missions which have been assigned to the battalion have routinely included engineering construction effort estimates, as well as substantial security in the execution. As a result, such missions have been regularly tasked to combat companies of the battalion. This is discussed further in 2.d. below.

Enemy intelligence is obtained on a weekly basis by two principal means, the first the USARV Weekly Intelligence Summary and the second, a weekly meeting of intelligence representatives of units and agencies of the City of Cam Ranh. The latter is a multi-national combined effort involving Vietnamese Army, Special Sector, National Police, city, US Army and Air Force, and ROK Marine intelligence personnel. Sightings, incidents, indicators and reports pertinent to the local area (City of Cam Ranh and adjacent areas of the II Corps Tactical Zone) are reviewed in detail. Conflicting information is reviewed in an attempt to refine the intelligence product. The battalion maintains continuing liaison with intelligence officers and collection activities of adjacent units, the 10th Aviation Battalion and B/51 Special Forces Detachment located at Dong Ba Thin, in an effort to keep abreast of the enemy situation on a day to day basis.

Intelligence reports of all types pertaining to the II Corps Tactical Zone (VN) have been extracted and collated in one location for ease of reference and ready review.

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The organization has been unable to obtain soils trafficability map coverage of the immediate area. As a consequence, through survey material and local reconnaissance, a soils trafficability map has been developed for the area of interest by the battalion.

Detachment 18, 30th Weather Squadron (USAF) at Cam Ranh Air Base has been an excellent source of weather information. Liaison was established early with this unit for 24 hour, monthly forecasts and severe weather warnings. All weather information is routinely distributed to units of the battalion to assist in planning for construction activities.

Alert, defense and physical security plans have been developed and tested, at least monthly, by the battalion. At the close of the period, three companies of the battalion and its attached units had displaced from interim cantonment locations to the Engineer Base Camp, a permanent cantonment of the Dong Ba Thin Military Complex. This has complicated interior guard and alert requirements temporarily, however upon completion of the movement of all companies to the permanent area, a fully integrated physical security plan, including assignments of sector defense and provisions for warnings, will be implemented in coordination with the 10th Aviation Battalion and ARVN Special Forces Training Center, as part of the installation (Dong Ba Thin Military Complex).

## d. Operations and Training.

The Advance Party of the 20th Engineer Battalion (Cbt) arrived in Vietnam on 18 December 1965, reporting to its parent headquarters, Headquarters, 35th Engineer Group (Const) at Cam Ranh Bay, on 20 December 1965. The 87th Engineer Battalion (Const) was designated host battalion and assisted both the Advance Party and the Main Body of the 20th Engineer Battalion in staging in and transiting the Cam Ranh Bay area. The Advance Party established initial liaison with supporting activities of the then Cam Ranh Bay Logistics Area and the Nha Trang Support Command, located and prepared an interim cantonment area near the Dong Ba Thin Military Complex and prepared a staging area near the Port of Cam Ranh to initially hold units of the battalion for a phased displacement to their cantonment location.

The Main Body of the battalion arrived at Cam Ranh Bay and off loaded on 1 January 1966, participating, on debarkation with the 39th Engineer Battalion (Cbt) in a ceremony during which the battalion colors were joined with others of the 35th Engineer Group (Const).

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Company A moved directly to the interim cantonment and established security of the area; Headquarters and Headquarters Company, Companies B and C located in the initial staging area. The units of the battalion which staged at Cam Ranh Bay, moved in phases to the interim cantonment area between 2 and 14 January 1966. Company C, the last company to close in the battalion cantonment, received on-the-job training, while staging, with the 87th Engineer Battalion (Const) on construction projects typical of those directed at Dong Ba Thin. This unit also was assigned the mission of assisting and supporting unloading, deprocessing and movement of organizational impedimenta as it arrived in Cam Ranh Bay.

On 14 January 1966 the USNS Robinson docked at the Port of Cam Ranh. Unloading and delivery of all supplies and equipment to the cantonment area from this ship was completed on 17 January 1966. The battalion was reported fully operational on 22 January 1966 following arrival and off-loading of the MSTS Morgantown Victory carrying the remainder of the battalion's organic equipment.

The objectives of operations during the early weeks of the period were two-fold: 1) the preparation of the battalion to live in the field, secure itself and use its equipment; and 2) the continuation of construction missions previously assigned to Company C, 65th Engineer Battalion (Inf Div), in the Dong Ba Thin area. The following activities characterized operations supporting the first objective: establishment of cantonment perimeter security, including defensive wire, automatic weapons bunkers, individual defensive positions and fields of fire; preparation of cantonment shelters, minimum sanitary facilities, a motor maintenance area, area roads and an area drainage system; function firing of all organic weapons; and the displacement, deprocessing and technical inspection of equipment prior to mission assignment. Operations supporting the second objective included reconnaissance and task familiarization by key officer and NCO personnel for missions assigned the units; direction and supervision of equipment support, already available in the 584th Engineer Company (LE) and 513th Engineer Company (DT), to provide uninterrupted engineer effort on construction previously undertaken by C/65th Engineer Battalion (Inf Div); liaison with supporting logistics activities, adjacent units, the Installation (Dong Ba Thin Military Area) Coordinator, and local civilian officials; on-the-job training for vehicle drivers and equipment operators, whose equipment had yet to arrive, with the attached engineer companies. Three work directives were received during this time requiring rapid response on the part of the organization: construction of the bridge approaches for an M4T6 float bridge erected as a Group effort, at My Ca; provision of engineer technical assistance to the B/51 Special Forces Detachment, involving a reconnaissance and preparation of estimates for special forces training facilities; and road maintenance on the road from QL-1 to the My Ca Bridge.



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The major effort of the battalion and its attached companies, as well as its primary mission, has been and continues to be construction of the Dong Ba Thin Military Complex. This complex (see Inclosure 2) is located in the center of an area (approximately 50 square kilometers) identified as the Dong Ba Thin Permanent Military Area. The area to be developed (the complex) is sited on an alluvial flood plain, stretching from the mountains on the West to Cam Ranh Bay on the East, with a generally constant natural slope of 0.3%. The plain is covered by a secondary rain forest. The complex lies astride the natural water course of a 12,500 acre watershed. The area is inundated much of the seasonal monsoon (October - December) by sheet flow to the bay. All construction at grade, vertical or horizontal, must be placed on fill. Thus, the fundamental engineering tasks confronting the battalion upon its arrival in the area were a massive earthmoving and fill stabilization effort, just to "get out of the mud" and the development of a comprehensive drainage plan, which initially could provide adequate drainage for construction completed prior to the 1966 monsoon.

An outline sketch of the complex based on current development plans is at Inclosure 3. On 1 January 1966, the 3,000 foot runway had been completed to the point where it was usable; the basic fill for the 10th Aviation Battalion Headquarters area had been completed, and basic fill for several of the roads in the 1600 Man Cantonment area had been placed. The land throughout, excepting the above areas, was completely flooded, including the ARVN Special Forces Training Center (not a part of construction). Two aviation airmobile companies, the 10th Aviation Battalion Headquarters, and the 335th Transportation Company (DS) were crowded into temporary shelters along the eastern edge and northern overrun of the runway. None of the area, except for the eastern most portion of the 1600 Man Cantonment area had been cleared.

The only source of borrow material available was the coarse, angular sand found north and south of the complex adjacent to the bay. The only proximate and secure source of stabilizing material was a hill of lateritic material located at the edge of the bay opposite My Ca, approximately three miles from the complex.

No topographic survey (horizontal and vertical control) for the area was available and no data concerning sea level datum or elevations at grade to be obtained existed. The only valid information available indicated that the runway had been above water during the 1965 monsoon and was active. As a result, "mean high water" (Cam Ranh Bay) was established as the heavy wash line evident along the western beach following the monsoon. Runway elevation was determined to be 6.51 feet above this datum. Consequently crown elevations for construction at grade were fixed for subsequent construction at 6.5 feet above the mean high water datum.

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Immediate efforts were placed on initiation of fill operations (estimated then at 1,500,000 cubic yards of loose measure sand borrow), an area topographic survey, and the development of a drainage plan.

The following construction in the area was then, and subsequently during the period, directed: completion of the 3,000 foot PSP (M8) runway, including shoulders, drainage and overruns; construction of the 1600 Man Cantonment to Standard 4, as materials became available; construction of a UH-1 heliport (75 each); construction of a CV-2 parking apron (18 each); construction of a CH-47 parking area (18 each); construction of hangar facilities (4 each) in the transient parking area and direct support maintenance area; construction of one warehouse for the direct support maintenance area; construction of a 200,000 square foot depot (involving 11 major structures); construction of two motor repair shops for the aviation battalion headquarters; construction of two administration buildings for the aviation battalion headquarters; construction of a 500 foot airfield extension and a 3,000 foot parallel taxiway with laterals to the runway; and a 900 man cantonment area to Standard 3 (to serve as an engineer base camp).

A number of factors complicated planning and construction effort during much of the period. The natural land surface was not sufficiently stable to support engineer equipment until mid-February; units at Dong Ba Thin on 1 January 1966 had to be phased into the 1600 man area as quickly as possible, both to clear the way for construction east of the runway as well as make room for an inbound CV-2 company; the CV-2 apron had to be completed for beneficial occupancy by 17 February 1966 to receive the aircraft of the CV-2 company arriving at that time; and no information was available as to the dimensions or structural detail of the larger building structures, other than that they were to be prefabricated and available at some future date.

Initial priorities involved the commitment of the entire earthmoving effort to fill operations in both the CV-2 and 1600 man cantonment areas on a 24 hour basis, in order to achieve maximum production. A borrow pit was opened north of the complex along the bay, and later to the south of the complex at the bay as access and construction roads could be developed. Stockpiling and hauling from both pits were alternated to keep up with the demands of the fill operation.

That the massive fill requirements at Dong Ba Thin far exceeded the capabilities of organizational equipment to accomplish in a rational time frame, was evident at the outset. This led to early and aggressive efforts to seek relief from this major limiting factor. Specifically, TOE equipment shortages which had persisted in the 584th Engineer Company (LE) since arrival in country (May 1965) were followed

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up by new supply actions, added equipment support was consistently requested from Group assets, and requests for equipment in excess of authorized allowances were submitted. The supply action, initiated in February, had by the close of the period yielded negligible results. The major attack on the problem was the presentation of a study on 9 February 1966, requesting dredge support (hydraulic fill operations) to meet the major portion of the Dong Ba Thin fill requirements. Favorable consideration has been given the request and utilization of a dredge, commencing in May 1966, has been programmed.

Survey support to augment limited existing capabilities of a combat battalion was quickly sought and obtained. The battalion has continually been supported by a team from the 35th Engineer Group (Const). This support has been utilized for almost all the siting, grading and drainage effort. Additionally, a detachment of the 569th Topographic Company was attached for purposes of providing a complete area topographic survey. The complex real estate boundary was surveyed and concrete reference markers placed along the perimeter. The area topographic survey provided for the extension of both horizontal and vertical control throughout the area.

Early clearing efforts were badly hampered by the inability to use engineer equipment on the existing surface. Daily utilization of from 200 to 400 unskilled indigenous laborers assisted considerably in basic clearance and burning.

During the months of February through April, fill operations continued with horizontal and vertical construction being initiated as soon as areas were filled and brought to grade.

To provide stabilization material for the numerous hard-stands, roads and taxiways, a laterite pit in the vicinity of the Ky Ca bridge was developed in early February. A "chinaman" loading ramp was constructed to permit two-face loading operations and to release critical loading equipment to other operations. The raw laterite obtained from the pit was mixed with large rocks and boulders thereby presenting major difficulties in final grade operations when placed. During early March a 75 ton per hour rock crusher was installed at the laterite pit which alleviated the problem previously encountered by the large rock. The crusher operation was accomplished by the quarry section of the 572d Light Equipment Company (under operational control of another organization).

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During the period a number of significant design projects were submitted and subsequently approved: an intermediate interceptor and internal drainage system, the CV-2 parking apron, UH-1 heliport, Engineer Base Camp, and the CH-47 parking apron.

The drainage concept submitted in the design provided for 1) a major drainage structure which could be developed in proximity to currently programmed construction to intercept the extensive sheet flow of the monsoon and divert it to the bay, and 2) an internal system to rapidly move runoff from the complex to the interceptor system and thence to the bay. The interceptor system provides for a 100 foot ditch, four feet deep, circumscribing the complex with earth berm, designed to move an anticipated 2,800 cubic feet per second of water volume flow. The system is regarded as intermediate and interim, as its purpose is to provide protection to the complex during the 1966 monsoon. A similar structure at a greater radius from the complex center would replace it during future development. Bridge designs consistent with the interceptor system, to permit passing the water across National Highway QL-1, have been submitted.

Approval of the 900 man cantonment (Engineer Base Camp) siting and design permitted construction operations to be initiated early in the period. Subsequent construction permitted by 30 April, the displacement of three units of the organization from their interim locations to the Dong Ba Thin Military Complex: 584th Engineer Company (LE), 513th Engineer Company (DT) and Headquarters and Headquarters Company, 20th Engineer Battalion (Cbt). It is significant to note, that although directed construction, much of the effort in the Engineer Base Camp was applied by personnel working over and above their normal duty shift day (10 hours).

The battalion opened and operated a sanitary fill during the period for units of the immediate area, sharing custodial responsibility with the 10th Aviation Battalion. No such facility was in use on arrival of this organization at Dong Ba Thin.

Additional missions were tasked to the battalion throughout the quarter. During the period February through April detailed route reconnaissance were performed on National Highway QL-1 from Phan Rang to Ninh Hoa (143 miles) and Highway HL-1 (12 miles). This effort involved classifying 125 bridges. A formal report, along with work estimates to improve the roads and bridges to a Class 50 two-way all-weather system along the entire route, as well as photographs of all bridges, was submitted to 18th Engineer Brigade. These reconnaissance were fully coordinated with Headquarters, I FFORCEV, and involved provisions for security. The HL-1 reconnaissance was performed entirely by foot.

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A ROK Armed Forces Radio Station, including antenna, has been constructed; completion awaits only receipt of critical construction materials, unavailable since February. Six quonset administrative buildings were constructed for the Headquarters, 2d ROK Marine Brigade. Emergency maintenance has been provided periodically for QL-1, from My Ca to Nha Trang, routinely maintained by the GVN. A crusher headwall was constructed and equipment support provided crusher operations of the 572d Engineer Company (LE) at the laterite pit.

Training activities have been oriented toward five distinct objectives identified as follows: command information (to better acquaint the individual soldier with his mission, environment and responsibilities), combat readiness training (to maintain the individual and unit combat skills), weapons employment (to maintain the "feel" and operation of the individual and/or crew served weapon), care and cleaning of individual and organizational equipment, and on-the-job training in virtually all skills (to support personnel shortages as well as meet the requirements of the construction mission). Fifteen hours every six weeks are accorded the first four training activities; on-the-job training is undertaken as a continuing process in the course of accomplishing the mission.

## e. Logistics.

(1) Labor. During the early stages of construction, 200 to 400 Vietnamese laborers (of approximately 600 employed by the 10th Aviation Battalion) were utilized under battalion supervision to conduct clearing operations over the entire complex. Due to saturated soil conditions as a result of the monsoon, clearing operations were initially impossible and subsequently slow and difficult with equipment. The Vietnamese laborers, although slow in nature, accomplished a considerable amount of the required clearing of brush and smaller trees with machete and home made knives. Skilled indigenous labor is in critical supply, particularly in the City of Cam Ranh (west), however space authorization has been requested of USARV to support the increasing demands of vertical construction and maintenance.

(2) Maintenance. Maintenance requirements placed a heavy burden on the resources of the battalion throughout the period. Operation of equipment on a 24 hour basis has required continuing stress on a sound maintenance program. Motor stables on all vehicles and equipment are performed twice daily, each for one hour, prior to the start of the day and night shifts. Contact maintenance teams are available and utilized on each shift for project site maintenance. Close supervision has been required by all levels of command to combat the high deadline rate

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associated with 24 hour operation in mud, sand and adverse weather. Command maintenance inspections, as well as the use of a "roadside" inspection team has resulted in considerably improved first echelon maintenance.

Initial direct support for maintenance and repair parts for ordnance automotive equipment was provided by the 19th Ordnance Company (DS) in Nha Trang. This proved to be both cumbersome and inadequate, due in part to the distance involved (25 miles each way) and the limited capabilities of the 19th Ordnance Company to provide the necessary support. Ordnance vehicles, particularly the 5 ton dump truck, critical to fill operations, were being held at the 19th Ordnance Company for periods up to 60 days for repair. During the last week of February, Ordnance and Engineer maintenance support was transferred from Nha Trang to the US Army Depot, Cam Ranh Bay, resulting in more efficient support because of shorter lines of evacuation and replacement.

Repair parts supply has been a major problem since the battalion arrived in Vietnam. Although 87.6% of the battalion PLL was at 100% fill upon deployment, the experience data required for new equipment had not been established. As a result vehicles and equipment have been deadlined in excess of 30 days awaiting receipt of "fringe" type repair parts and high demand CEI parts beyond one PLL. Although the RED BALL express system was initiated to avoid excessive down time and has helped, numerous delays are still being experienced. Average time for receipt of parts placed on RED BALL requisition has been 20 to 30 days. Recent authority to stock two PLL's should help to reduce the period of time the equipment is down for parts in the long term.

The average deadline rate experienced by this battalion since arrival in Vietnam has been 20% for ordnance-automotive and engineer equipment and 15% for signal equipment.

(3) Supply. The construction mission assigned the battalion following its arrival in Vietnam, necessitated a realignment of supply personnel resources within the battalion. The S-4 section was augmented with company supply sergeants and other details, as required, to handle the tasks of administration, transportation, storage and issue of construction materials required for the Dong Ba Thin projects. This task was at first monumental and required day and night operations to keep the supplies and materials moving in order to set up the battalion cantonment area and commence construction operations. During the period January through April 1966, 2,300 tons of supplies and materials were hauled by organizational transportation.

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The initial supply source for all classes of supply was located in Nha Trang, about 25 miles from Dong Ba Thin, over poorly maintained roads. A request was made to 35th Engineer Group (Const) during the latter part of January 1966 to transfer logistical support from the Nha Trang Support Command to the Cam Ranh Bay Logistics Area (11 miles away over improved roads). After repeated follow-up requests were made, a transfer was finally effected to the US Army Depot, Cam Ranh Bay on 23 February 1966 for Class I, II, IV and V supplies. Class III supplies were locally obtained from the Class III distribution point existing at Dong Ba Thin. This shortening of the supply line has reduced travel time and has considerably reduced the wear and tear on organic supply vehicles.

The three 5-ton dump trucks TOE to the S-4 section were not appropriate for hauling the huge quantities of supplies and materials required for the battalion and construction projects. Consequently, they were hand-receipted to the line companies for fill operations and the 2½ ton cargo trucks of the S-1, S-3 and Communications Sections were moved to the S-4. In addition, the truck tractors, 5 ton with 25 ton trailers, organic to the line companies were frequently utilized for hauling construction materials. This arrangement allowed for more effective use of organic transportation.

During the period 21 January 1966 through 28 February 1966, emergency support was rendered to the 63d Quartermaster Water Point at Dong Ba Thin. Although not assigned a water supply mission, the battalion used two of its organic 1,500 gallon per hour water purification sets to provide potable water to over 2,000 troops in the Dong Ba Thin area. This support was initiated when the installation's water purification set, 3,000 gallon per hour, was deadlined and had to be replaced with an entirely new set. On 28 February 1966, this emergency support was terminated after production of 400,000 gallons of water. During this same period numerous reconnaissance were made throughout the Dong Ba Thin area in attempts to locate additional potable water sources. Water was fast becoming short in supply and additional sources had to be located to provide water during the coming summer. All attempts to locate existing water sources and to develop shallow wells have been unsuccessful.

During the reporting period, the following quantities of major Class IV materials were placed on requisition in support of directed construction projects:

Cement: 5,700 bags  
Lumber: 172,281 board feet  
PSP: 1,845 bundles  
Nails: 5,855 pounds  
Burlap: 509 rolls

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Quonsets: 11 each  
Asphalt: 311 drums  
Culvert, CMP: 1,062 linear feet  
Wire, 14 gauge: 8,920 feet

(4) Services. Initially, upon arrival in the Dong Ba Thin area on 5 January 1966, the battalion's laundry needs were served by the 148th Quartermaster Company. However, on 3 February 1966 due to higher priorities of combat units the 148th Quartermaster Company was moved to another area. On 28 February 1966, an organizational laundry contract service was provided through the Nha Trang Support Command. This contract provided for the cleaning of organizational type clothing and equipment only. No facility was thus available to provide laundry service for individual clothing. Available Vietnamese laundry facilities within reasonable distance of the battalion were not sufficient to handle the workload and the price to the individual was as a result prohibitive. A laundry point facility was established outside and adjacent to the battalion cantonment area. With the unanimous consent of all personnel, it was agreed that the battalion would hire a number of Vietnamese nationals to operate this laundry facility. These people are paid by the monthly voluntary contributions of personnel. The cost per man is still well below that paid if the individual had his clothing washed on the open market. Vietnamese laundry girls were hired on 2 March 1966. Each was processed through military and civilian channels for security clearances and medically examined by the Battalion Surgeon. To date this facility has worked out well, providing timely and good quality laundry service at minimum cost.

(5) Medical. Medical service, consisting of routine outpatient and emergency care, is provided by the Battalion Medical Section. The section also administers immunizations and cares for patients on quarters status. Personnel reporting has progressively increased from a low of 212 patients seen in January to 512 in April for a total of 1,408 patients. This increase can be attributed somewhat to the constant increase in high temperatures, increased exposure to construction hazards, i.e. lifting and loading heavy materials, and the increased exposure to venereal disease in civilian communities. Immunizations given to the battalion and attached companies has totalled 2,733 over the four month period.

Routine and emergency dental service is provided by the KJ Team located in the 10th Aviation Battalion Dispensary at Dong Ba Thin; prosthetic care is provided by the KJ Team at the Cam Ranh Dental Clinic. Optical and orthopedic support is provided by the 32d Medical Depot, Nha Trang Support Command.

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Patients requiring evaluation are sent to the Cam Ranh Air Base Hospital or the 8th Field Hospital, Nha Trang.

Stringent sanitary conditions have been enforced since arrival in Vietnam, with the result that an extremely low number of personnel have suffered diseases normally attributed to poor sanitation. Field sanitation teams are established in each subordinate unit to support a continuing preventative medicine program. Periodic inspections by the Battalion Surgeon have been conducted to insure the necessary field sanitation standards have been met.

f. Communications. The communications capability of the battalion when it deployed was, at best, a poor satisfactory. In addition to being short 24 radio operators out of 27 authorized, the radio communications equipment was of the old series and, having been in use for a number of years, barely met deployability criteria. To offset the shortage of radio operators, pre-deployment classes in radio operation were conducted for selected personnel; radio-telephone procedure classes were also conducted for these personnel on board the USNS Weigel while enroute to Vietnam. The latter training also included an introduction to C.W.

Upon arrival in Vietnam and initiation of construction projects, radio nets were established between all units, company work sites and the battalion net control station. Use of the radio, including emphasis on authentication and brevity codes, has provided invaluable training and has also assisted, to a great extent, in the command control of projects. Radios have also been employed successfully in the security of the battalion cantonment. Continuous radio contact is maintained between key security bunkers and the Battalion Command Post to insure instantaneous communications for positive command and control in the event of a threat, incident or attack.

Difficulties have been encountered in receiving adequate maintenance support from the direct support facility in Nha Trang Support Command. Although maintenance support was transferred to Cam Ranh Bay (US Army Depot, Cam Ranh Bay) during the last week of February 1966, two work orders for the repair of radios were still outstanding at Nha Trang as of 30 April 1966. Maintenance support from the 128th Signal Company in Cam Ranh Bay has been considerably improved over that received from Nha Trang, although the frequency of repairs required has increased due to constant use of the radios and the age of the sets.

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## g. Installation.

Dong Ba Thin Permanent Military Area is a sub-installation of Nha Trang, installation support being provided by the Nha Trang Support Command. The Commanding Officer, 10th Aviation Battalion, principal tenants at Dong Ba Thin, has been designated Installation Coordinator. The Dong Ba Thin sub-installation has immediate installation responsibilities relating to the development, water supply, POL supply, installation security and limited repair and utilities support. This battalion closely coordinates with the Installation Coordinator on matters relating to its tenancy as well as in matters pertaining to construction.

Monthly meetings are held for principal commanders of units and agencies located in the City of Cam Ranh, with the Mayor. Here also, matters bearing on local and installation security, enemy intelligence, traffic control, civic action, community relations, medical problems and labor are reviewed and common courses of action to the benefit of all are determined. The battalion as a unit and as a tenant at Dong Ba Thin actively participates in and supports actions resulting from these meetings.

h. Civic Action. The 20th Engineer Battalion (Cbt) Civic Action Program was initiated on 28 January 1966 with the publishing of orders appointing a Civic Action Committee and a Civic Action Officer. Immediately thereafter, the committee investigated possible locations in which to concentrate the organization's civic action efforts. The committee conferred with the Mayor of the City of Cam Ranh, US Military Advisors to the Mayor of Cam Ranh, USAID officials, as well as the Village Chief of Cam Phuc and the Hamlet Chief of Tan Thanh. These preliminary efforts were expended in order to select an appropriate area for the battalion's civic action effort in close proximity to the location of the battalion. Such a location would minimize security risks to personnel, reduce equipment and transportation problems, and increase time and resources which could be applied to civic actions projects.

Medical and surgical out-patient care has been provided for the population of Ba Ngoi on a once-a-week basis by the Battalion Medical Section. This medical care at Ba Ngoi was initiated on 4 February 1966. Since its inception approximately 428 patients have been examined and treated. Arrangements have been made to evacuate those personnel requiring hospitalization to the provincial hospital in Nha Trang. On 16 February 1966 a MEDCAP program was initiated in the Hamlet of Tan Thanh on a once-a-week basis. Prophylactic anti-biotics have been administered to approximately 295 persons to reduce the incidence of communicable disease in the



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local area. The MEDCAP program in Tan Thanh has been temporarily discontinued because of lack of supplies. A request for approval of a MEDCAP program was forwarded to higher headquarters on 19 February 1966. No reply had been received as of 30 April 1966, although continuous follow-up action has been taken. The citizens of Ba Ngoi and Tan Thanh were provided medical care they would not otherwise receive, thereby improving the health and welfare of these communities and fostering better relations between the people of Vietnam and US Military Forces.

On 21 February 1966 the battalion published a Military Civic Action Plan (see Inclosure 4), which outlines the duties, responsibilities and procedures to be utilized in providing civic action support to the Hamlet of Tan Thanh. The plan provides guidance for projects which center around health and welfare, construction, commerce and industry and/or agriculture and natural resources. This plan provides systematic guidance to Task Force Commanders as they plan, develop and execute approved civic action projects.

At the request of the Mayor of the city of Cam Ranh, the battalion began to clear a refugee area approximately 400 x 500 meters located about one mile north of Tan Thanh on 7 March 1966. This project was completed on 16 March 1966. Four-hundred-sixty man and 140 equipment hours (dozer) were expended in completing this project. This area will provide a housing site for approximately 100 displaced families.

On 12 March 1966 the Battalion Civic Action Committee received approval from the Mayor of the City of Cam Ranh to undertake the following civic action projects in the Hamlet of Tan Thanh:

- Construction of a 60 pupil school house with adjacent playground.
- Construction of a medical dispensary.
- Removal of tree stumps from tillable land.
- Institution of a program of proper trash and garbage disposal.

Further study will be made to consider the feasibility of constructing an earth dam for a water reservoir with future expansion to include an irrigation system for agricultural advancement, and constructing a road through the hamlet to the beach area from Route QL-1.

As of 20 April 1966 work had begun on several of these projects. It is worthy of note, that the local citizenry have begun to participate in this effort with personnel of the battalion.

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## 4. Statement of General Progress:

a. Directed Effort. During the period 1 January to 30 April 1966, the battalion was assigned and has undertaken work on 21 work or construction projects directed by Headquarters, 35th Engineer Group (Const). Eleven projects have been completed at the location and for the using agency shown (where applicable):

- (1) Airfield (3,000', M8 PSP)  
Dong Ba Thin Military Complex  
10th Aviation Battalion
- (2) UH-1 Heliport (75 20' x 20' concrete helipads)  
Dong Ba Thin Military Complex  
10th Aviation Battalion
- (3) CV-2 Parking Apron (1,200' x 400', M8 PSP)  
Dong Ba Thin Military Complex  
10th Aviation Battalion
- (4) ROK 2d Marine Bde Hqs (6 each 20' x 48' standard quonsets)  
Dong Ba Thin vicinity  
ROK 2d Marine Brigade
- (5) Administrative Buildings (2 each 20' x 48' tropicalized  
quonsets)  
Dong Ba Thin Military Complex  
10th Aviation Battalion
- (6) Third Country Troop Support (equipment and carpentry  
support)  
Dong Ba Thin vicinity  
ROK 2d Marine Brigade
- (7) ROK Heavy Equipment Support (earthmoving and drainage)  
Dong Ba Thin vicinity  
ROK 2d Marine Brigade
- (8) My Ca Float Bridge Approaches  
My Ca  
553d Engineer Company (FB)
- (9) Engineer Technical Assistance (training facilities)  
Dong Ba Thin - Hoa Do area  
B/51st Special Forces Detachment, 5th Special Forces Group

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(10) Route Reconnaissance (Routes QL-1 and HL-1)  
Phan Rang to Ninh Hoa

(11) Crusher Headwall  
My Ca (West)  
572d Engineer Company (LE)

Considerable additional effort has been expended in the Dong Ba Thin Military Complex bringing the remaining projects to various stages of completion. The more important of these are provision of Standard 3 accommodations for two airmobile companies and a transportation direct support maintenance company (1600 man cantonment), completion of a 40,000 square foot M6 PSP hardstand for the direct support maintenance company, effective completion (excludes adjacent dressing and drainage) of a 3,000 foot M8 PSP parallel taxiway with connecting laterals and warmup aprons, provision of Standard 3 accommodations for three engineer companies (900 man cantonment), and completion of land clearance for all remaining construction currently programmed.

b. Battalion Projects. Numerous battalion directed projects have been undertaken in support of directed construction. The most important of these include borrow pit and laterite pit operations, operated on a continuing basis to provide fill and stabilizing material. Additionally, work on the intermediate interceptor drainage system for the Dong Ba Thin Military Complex has been undertaken as a battalion project; the system has been completely roughed in on the west and north sides of the complex.

c. Recapitulation of Effort. Construction effort, by project, is summarized for the period 1 January 1966 through 30 April 1966 on Inclosure 5. A graphic visualization of the status of construction in the Dong Ba Thin Military Complex is shown on Inclosure 3.

## Section II. Commander's Recommendations:

### 1. POM and Deployment.

a. Discussion. During the pre-deployment phase of a non-emergency deployment, training time is extremely valuable. Normally this training must be carefully programmed and oriented to accommodate all other preparatory actions required in the POM as well as the late receipt of filler personnel in critical MOS's. In the absence of special guidance, emphasis during the available training time will be directed toward readiness of the unit and individual to perform the TOE mission. Such was the case of the 20th Engineer Battalion (Cbt).

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b. Recommendation. Where an organization is to be committed, following its deployment, to a mission which differs materially from that for which it is organized, equipped and trained, earliest and official indication of such a requirement is recommended, in order that pre-deployment training may be properly modified and directed.

## 2. Employment.

a. Discussion. Although the 20th Engineer Battalion (Cbt) was augmented by the attachment of an engineer light equipment company and a dump truck platoon, severe deficiencies in equipment and organization became apparent when committed, in the main, to a construction mission.

(1) The following equipment, not available to the organization as augmented, has been required to support the mission:

(a) Generator, 10 KW (four available by TOE used in water purification sets)

(b) Reproduction set, moisture process

(c) Shop equipment, woodworking, trailer mounted

(d) Shop, general purpose repair, trailer mounted

(e) Test set, soil

(f) Vibrator, concrete

(g) Saw set, DeWalt (or equivalent), trailer mounted

(h) Lift, cross country, RTL, 6,000 pound capacity

(i) Tractor, full tracked, with ripper

(2) The following equipment, one or more of which are found in the organization as augmented, has been consistently required in greater numbers to adequately support the mission:

(a) Tractor, 830M (or equivalent) with 18 CY scraper

(b) Loader, scoop, 2½ CY

(c) Water distributor, 1,000 gallon

(d) Mixer, concrete, 16S

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- (e) Survey set, general purpose
- (f) Shop, contact maintenance, truck mounted
- (g) Lubricating and servicing unit, truck mounted
- (h) Roller, 3 wheel, 5/10 ton, steel, motorized (or equivalent)
- (i) Welding shop, truck mounted
- (j) Truck, dump, 5-ton

(3) The following functional areas of the battalion organization have required additional personnel to provide a capability or augment existing capabilities as indicated:

- (a) S-3: construction engineering, drafting, survey.
- (b) Battalion Maintenance: engineer equipment and wheeled vehicle maintenance.
- (c) S-4: materials handling, utilities construction support.

b. Recommendation: In order to enhance the flexibility of engineer combat battalions so that they may be efficiently employed as Category II units in a construction role, it is recommended that the concept of standard construction augmentation packages (selected personnel and equipment to augment combat battalions) be studied, developed for test and field tested for possible use in a theater of operations.

## **3** Lessons Learned.

### a. POM and Deployment.

- (1) Item. Late receipt of replacements.

Discussion. During the last phases of POM, many personnel reported to the organization as fillers who were either not POR qualified or had non-engineer MOS's.

Observation. A training program must be established early in the organization POM to provide necessary last minute training in POR subjects for late arrivals. Personnel with non-engineer MOS's must be assigned on a highly selective basis to make maximum use of their aptitudes or past training and assure earliest effective on-the-job training subsequent to deployment.

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## (2) Item. Prescribed Load List (PLL).

Discussion. During POM prescribed load lists for newly received equipment were revised and requisitions submitted as early as possible. Late receipt of new type equipment necessitated submitting POM requisitions just prior to deployment. Few of the items requested on POM requisitions have been received since arrival in Vietnam.

Observation. Units must be informed early during POM of new items of equipment which will be received just prior to deployment, together with adequate reference material upon which to revise PLL's, in order that supply actions involving POM requisitions may be avoided.

## (3) Item. POM Schedule and Checklist.

Discussion. Many commissioned and non-commissioned officers have never participated in a unit deployment overseas or been exposed to strategic mobility exercises.

Observation. Carefully prepared POM schedules, together with functional checklists for responsible staff officers and unit commanders, can assist in avoiding last time, costly mistakes and duplication of effort.

### b. Employment.

#### (1) Item. Refrigeration.

Discussion. The use of perishable medical supplies, as well as perishable rations, establish a necessary requirement for refrigerated storage for forces in Vietnam. The significant morale benefits derived from being able to provide cold liquids to drink, at least once a day in such an environment, additionally support the requirements for refrigeration.

Observation. Refrigerated storage (24 cu ft and greater) as well as power sources for such storage are normally installation property and not immediately available to deployed units. Provision of some refrigerated storage (other than NAF) with generator units might well be designated discretionary WABTOC items for organizations deploying to Vietnam.

#### (2) Item. Aircraft Parking Aprons.

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Discussion. The use of PSP parking pads for Cv-2, smaller fixed wing aircraft and helicopters, when significant earth-work (fill and stabilization) precede the placement of pads, have proven to be wasteful of valuable equipment hours. The foregoing is true because of the complex drainage pattern inevitably established and the corresponding awkward employment of grading and compaction equipment.

Observation. Although more expensive in terms of PSP and manhours, the mass parking apron (generally placed at constant slope) is far more easily prepared for PSP, more durable, and of considerably greater value to the user for access, maintenance, and aircraft movement.

## (3) Item. Materials Handling Equipment (MHE).

Discussion. The constructing organization or unit must inevitably double handle large quantities of construction materials when located some distance from Class IV supply sources. This is particularly true when large quantities of bulky and heavy supplies are rapidly consumed, e.g. cement and PSP. Additionally, good project management normally provides for availability and uninterrupted supply to the project site where these materials are required.

Observation. The problems relating to handling, movement and storage are vastly simplified by MHE, saving considerable in inefficient manhours (rigging and stacking) and equipment hours (crane and front loader). Medium capacity lifts should be organic to engineer battalions (construction and combat) for handling of Class IV materials.

## (4) Item. Placing M8 PSP.

Discussion. At least three different manufacturers have been identified with M8 PSP. The minor differences existing in the product between the three are such that difficulties in alignment (in both dimensions) become quickly apparent when mass areas of PSP are placed.

Observation. The problems with placing M8 PSP can be eliminated by using a constant slope (approximately 0.5%) and by rigorously segregating the M8 by manufacturer.

## (5) Item. Forming Concrete Pads.

Discussion. The use of wood forming for concrete pads involves several added steps in forming, new nails with each forming

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task, partial replacement of lumber after minimum reuse and inconsistent results (Particularly where forming lumber is semi-hardwood subject to warpage in two dimensions).

Observation. Steel forms for concrete pads are vastly more economical of time and materials, as well as providing a far higher quality result.

(6) Item. Identification of critical equipment.

Discussion. During the conduct of continuing and diverse construction operations, certain items of equipment become critical to the sustaining of the operation. Experience indicates, for example, that the loss of a front loader may stop hauling operations affecting many other phases of a project. A water distributor is essential for concrete work, compaction and dust control.

Observation. Where equipment assets are limited, continuing command emphasis is necessary not only to provide the proper maintenance for these items, but to identify, in connection with construction priorities, those items which are most critical in order that maintenance priorities may be similarly established.

(7) Item. Cross training of personnel.

Discussion. Units of the combat battalion are not manned to provide drivers and operators for sustained 24 hour operation of trucks and equipment.

Observation. Cross training of all personnel of engineer operating squads in driving 5-ton dump trucks and an augmentation in the number of operators assigned to the equipment sections is necessary for two shift operation.

(8) Item. Lighting for night operations.

Discussion. In many instances, work at night has been slowed by lack of adequate lighting at work sites. Vehicle headlights are at best a poor substitute for floodlighting sets. Floodlighting sets are not currently provided combat battalions.

Observation. Sufficient lighting equipment must be obtained to provide necessary lighting for efficient night construction operations.

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- (9) Item. Use of lateritic soil on top level of fill.

Discussion. Raw lateritic soil has been used in a compacted six inch lift to stabilize fill in the Dong Ba Thin Military Complex. Many problems have been encountered in final grading due to the large boulders of up to 36 inches in diameter which are inevitably present in the raw laterite.

Observation. Lateritic material taken from sources or pits with rock core must be screened or crushed to provide a workable material for final grading and compaction.

- (10) Item. Shortage of survey personnel and equipment.

Discussion. A severe shortage of survey personnel exists in a combat battalion committed to construction. This often delays final grading operations and requires limited survey work to be done by relatively inexperienced or unskilled personnel.

Observation. Maximum use must be made of improvised equipment, hand levels and line levels. Platoon leaders with a civil engineering background must be employed to meet survey requirements on many platoon projects.

- (11) Item. Prevention of rust.

Discussion. Due to the high humidity, rain and the proximity to salt water, weapons and exposed ammunition have a tendency to corrode rapidly. The longer this corrosion is left unchecked the worse it becomes, until the weapon or ammunition becomes useless.

Observation. Command emphasis must be placed on daily care and cleaning of weapons ordnance. Frequent inspections help to insure that this policy is carried out.

- (12) Item. Excessive wear on radiator, tractor, FT, Allis Chalmers.

Discussion. Operation under sand conditions produces great wear on radiator tubes causing pinhole leaks.

Observation. If armored core radiators are not available, drivers must be cautioned, when walking equipment, to drive forward, not backward, thereby reducing the amount of sand and dust pulled into the radiator.

- (13) Item. Fuel contamination.

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EGACBD-CO

15 May 1966

SUBJECT: Operational Report on Lessons Learned for Quarterly Period  
Ending 30 April 1966, Reports Control Symbol CSGPO-28(R1)

Discussion. A great deal of water has been found in diesel fuel. The water causes both maintenance and operating problems in diesel and multifuel engines.

Observation. Fuel tankers must be checked daily for water. Separator filters must be changed frequently. Fuel filters on equipment, especially multifuel, must be drained daily.

(14) Item. Faulty air compressor diaphragms.

Discussion. Diaphragms on the 250 CFM air compressors, manufactured by Joy, last from two to three weeks during sustained 24 hour operations.

Observation. Prescribed Load Lists must be constantly revised, as demand experience is accumulated, to insure that an adequate supply of diaphragms are requisitioned and on hand.

(15) Item. Care, service and use of vehicles and equipment.

Discussion. The heat, humidity, sand and dust conditions prevalent during operations, have reduced the life of all equipment and vehicles in Vietnam. All rubber and petroleum products wear out much faster due to the heat and sand, and metal contact surfaces wear much faster due to sand and dust abraasive actions. Other items of equipment such as tents, clothing and leather boots are subject to mildew and rotting.

Observation. It is necessary to periodically instruct all personnel on the proper use and maintenance of their equipment while serving under these conditions. Vehicles and equipment are lubricated more frequently; heavier oil is used in hydraulic systems; and the electrolyte in batteries is diluted because of the heat. Continuing emphasis must be placed on keeping clothing dry and vehicles and equipment clean, as well as lubricated, in order to maintain their useful life under these conditions.

(16) Item. Provision of weather-tight, secure storage for expendables and TA 50-901 items.

Discussion. An expedient means of providing weather-tight supply area for small expendable and TA items is required for security and protection.

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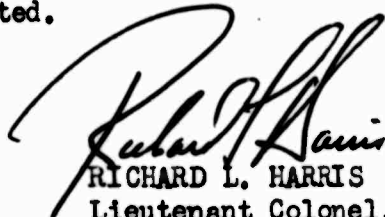
EGACBD-CO

15 May 1966

SUBJECT: Operational Report on Lessons Learned for Quarterly Period  
Ending 30 April 1966, Reports Control Symbol CSGPO-28(R1)

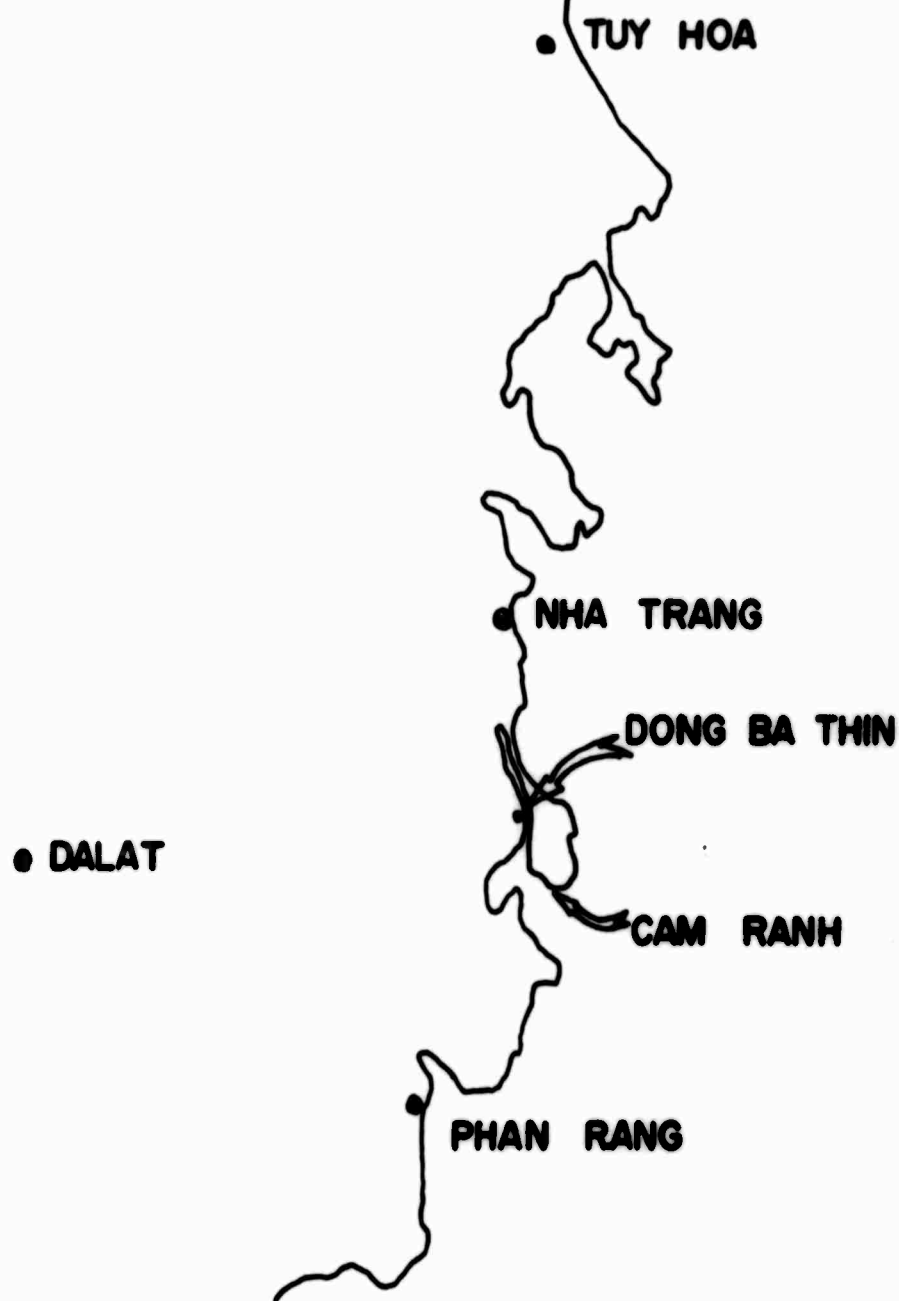
Observation. An effective storage area is obtained by raising the tent frame of a straight wall maintenance tent approximately two feet until the eaves of the tent are slightly above the level of a CONEX container. The size of the tent and the CONEX's are such that four CONEX's fit along each side evenly. The sides of the tent may be spread over the top of the CONEX's to provide drainage to the outside and away from the inside. Walls and doors, at front and rear of the tent, may be additionally constructed.

5 Incl  
as

  
RICHARD L. HARRIS  
Lieutenant Colonel, CE  
Commanding

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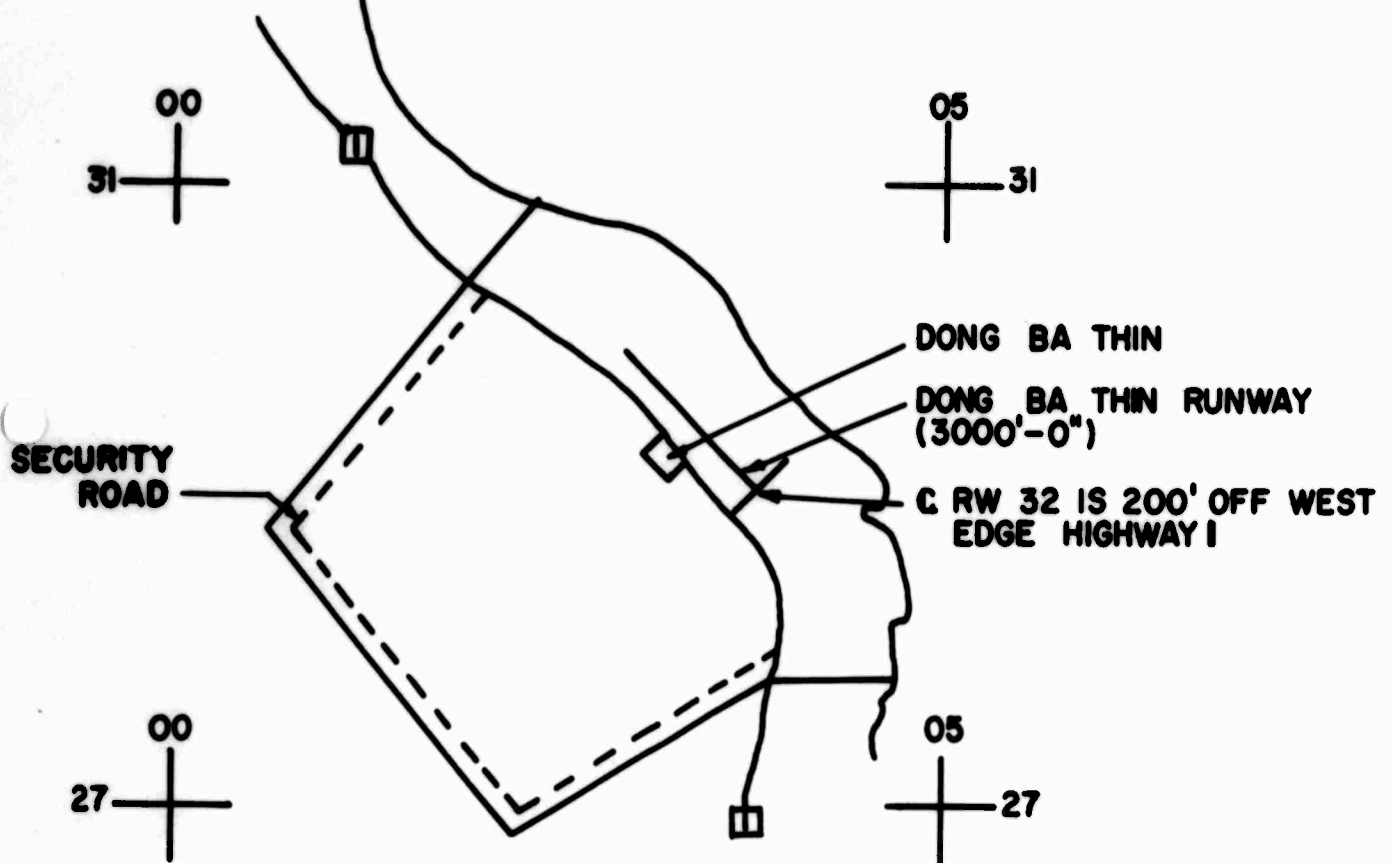
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REFERENCE:

MAP: SUOI - VINH  
SHEET NO: 6847 III  
SERIES: L 701

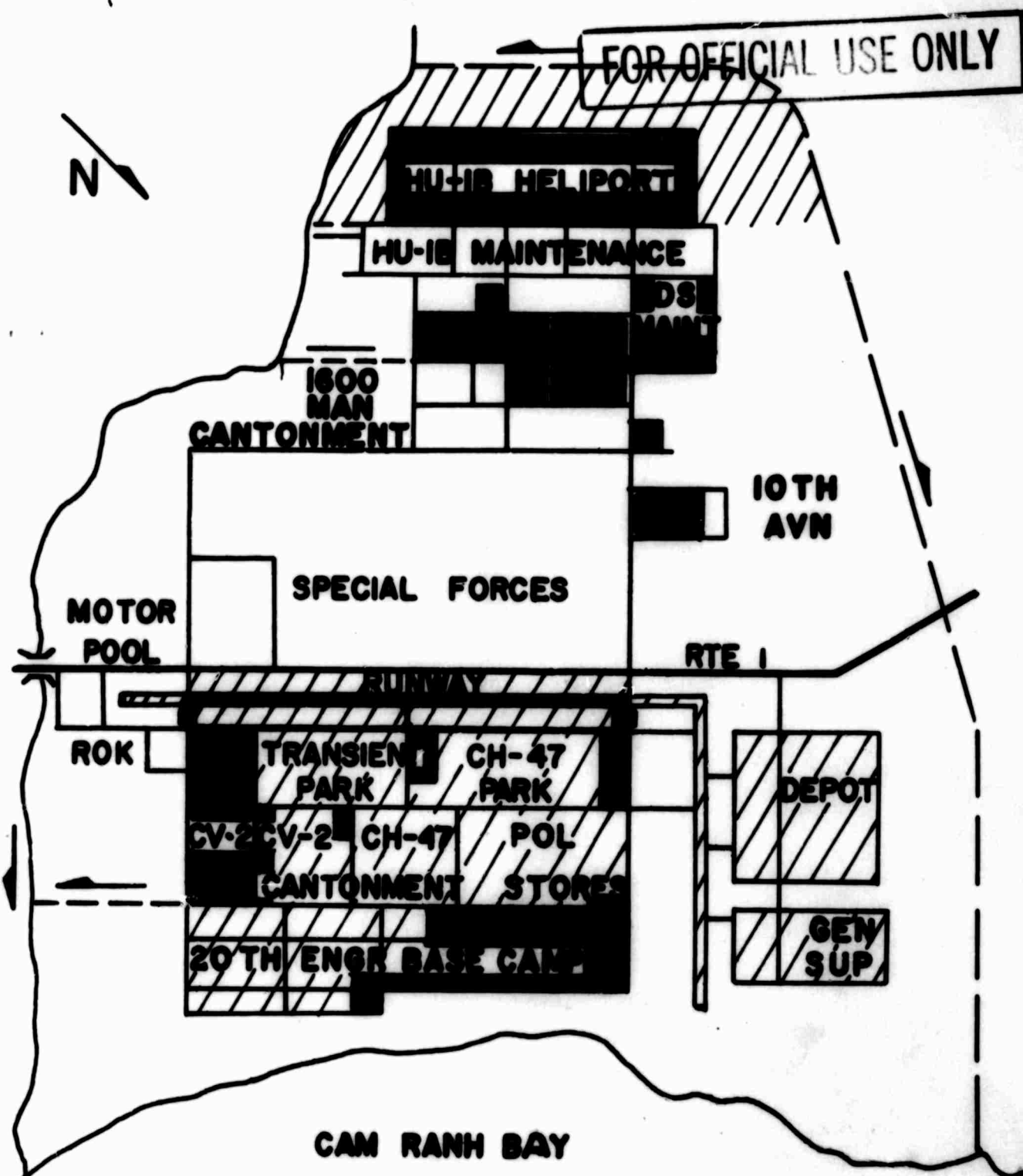


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*Amcl 2'*

# DOI 3 BA THIN COMPLEX ROAD NETWORK



## LEDGEND



COMPLETED CONSTR

CONSTR AT GRADE

CONSTR BELOW GRADE

SCALE 1"=1000'

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Incl 3'

Headquarters, 20th Engr Bn (Cmbt)  
DONG BA THIN, RVN  
21 February 1966

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**MILITARY CIVIC ACTIONS PLAN 1**  
References:

- a. FM 41-10
- b. MACV Directive 10-1
- c. MACV Directive 40-9
- d. USARV Regulation 10-1, as changed
- e. 18th Engineer Brigade Regulation 10-1, as changed
- f. 35th Engineer Group (Const) Regulation 10-1

**TASK ORGANIZATION**

Task Force Alfa: A Co., 20th Engineer Battalion (Cmbt)  
Hq Co., 20th Engineer Battalion (Cmbt)  
Task Force Bravo: B Co., 20th Engineer Battalion (Cmbt)  
513th Engineer Company (DT)  
Task Force Charlie: C Co., 20th Engineer Battalion (Cmbt)  
584th Engineer Company (IE)  
Task Force MEDCAP: Medical Section, Hq Co., 20th Engineer Battalion  
(Cmbt)

1. **SITUATION:** Within the US mission in Vietnam, responsibility for primary Civil Affairs role, including Civic Action, is vested in the US Operations Mission (USOM). USOM is responsible for the program supporting a counterinsurgency effort designed to have a direct and immediate impact on the rural population. This program is directed at rapidly providing resources to the rural sector of society to assist in improving living standards and developing governmental machinery in those areas responsive to the needs of the people. US Military Assistance Command (MACV) provides the advisory effort in support of Republic of Vietnam Armed Forces (RVNAF) military operations in Vietnam and these advisors are emphasizing the importance of an integrated Civic Action Plan at all RVNAF levels for all operations. The 18th Engineer Brigade, 35th Engineer Group (Const) and the 20th Engineer Battalion (Cmbt)(+) possess personnel and equipment assets which can be used to make a significant contribution to the program. Both USOM and MACV encourage a vigorous, integrated Civic Action Program with centralized control of resources and execution.

*Incl 4'*

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4. Process requests for materials required to support approved MILCAP projects. (TF A, B, C through Civic Action Officer)

(c) Phase III, Subsequent Undertakings (agency)

1. Initiate MEDCAP (TF MEDCAP)

2. Continue and complete projects initiated in Phase II; initiate and complete projects requiring materials, as material become available. (TF A, B, C)

3. Provide continuity to 20th Engineer Battalion MILCAP by repeating those actions in Phase I and II necessary to the execution of Phase III. (All)

b. TF Alfa (CO, A Co is TF Commander):

(1) Prepare MILCAP project plan which support HEALTH AND SANITATION (see Inclosure 1, reference e.).

(2) Execute approved projects at the earliest possible time.

c. TF Bravo (CO, B Co is TF Commander):

(1) Prepare MILCAP project plans which support CONSTRUCTION (see Inclosure 1, reference e.).

(2) Execute approved projects at the earliest possible time.

d. TF Charlie (CO, C Co is TF Commander):

(1) Prepare MILCAP project plan which support COMMERCE AND INDUSTRY a/o AGRICULTURE AND NATURAL RESOURCES (see Inclosure 1, reference e.)

(2) Execute approved projects at the earliest possible time.

e. TF MEDCAP (Battalion Surgeon is TF Commander):

(1) Apply for provision of MEDCAP assistance to TAN THANH.

(2) Initiate MEDCAP at earliest possible time.

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b. Labor . Maximum participation in MILCAP projects by the people of TAN THANH is desired. Task Force Commanders will identify how people may be constructively utilized in development of projects, self-help, technical assistance or education. Arrangements for participation will be made by the Civic Action Officer.

c. Public Information. MILCAP projects implemented by task forces of this command will be publicized to gain loyalty, support and respect of the people. Public Information Officer, 20th Engineer Battalion (Cmbt) will coordinate with Task Force Commanders in the preparation of photographs and news releases. Drafts of news releases and photographs will be submitted by the PIO to the Civic Action Officer for inclosure with the weekly Civic Action Report.

d. Reports.

(1) Task Force Commanders will submit weekly Civic Action Report, as requested by the Civic Action Officer.

(2) Civic Action Officer will prepare and submit the Civic Action Report specified in reference e. and f.

5. COMMAND AND SIGNAL: No change from standing operating procedures.

Acknowledge

RICHARD L. HARRIS  
Lt Col, CE  
Commanding

DISTRIBUTION: A  
OFFICIAL:

*C. Wentworth*  
Wentworth  
S-3

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RECAPITULATION OF ENGINEER EFFORT

Through 30 April 1966

**P R O J E C T**

	Log 35-73 Airfield	Bde 65-13DC-35 1600 Man Cantonment	Bde 65-14DC-35 HU-1B Helipads	Bde 65-15DC-35 CV-2 Parking Apron	Bde 65-16DC-35 CH-47 Helipads	Bde 65-47DC-35 Admin Bldgs	Bde 65-61DC-35 Warehouse Depot	Bde 65-68DC-35 Warehouse (DS)
Man Hours	33,088	82,687	49,348	59,624	2,797	2,175	4,711	11,507
US Troops	18,424	82,047	36,610	44,352	2,797	2,175	1,051	11,507
Indigenous	14,664	640	12,738	15,272			3,660	
Equipment Hours	9,683	36,977	14,185	18,181	1,941	490	790	7,636
Tons of Fill	3,135	307,052	32,276	67,710	76,920	441		60,328
Yards of Concrete		904	561					
Acres Cleared			36.5	28.6			60	5
Miles of Roads		2.5	4.6	2.1			0.5	
Feet of Runway	3,000							
Vertical Const (sq ft)		7,960				1,920		
Laterite Placed (tons)		2,550	10,532	20,113				570
PSP Placed (sq ft)				408,068				40,000
Taxiway (lin ft)				65				

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RECAPITULATION OF ENGINEER EFFORT

Through 30 April 1966

PROJECT

	Bde 66-9DC-35 900 Man Contingent	Bde 66-14DC-35 Airfield Extension & Taxiway	Bn 66-23 Drainage	SUB TOTAL DONG BA THIN	Bde 65-37DC-35 ROK Marine Bde Headquarters	Bde 66-22DC-35 ROK Armed Forces Radio Station	Gp 35-69 Third Country Troop Support	Gp 35-82 Hvy Equip Spt ROK Marine Bde
Man Hours	78,061	35,018	582	359,598	6,099	3,188	5,023	487
US troops	51,631	31,938	582	283,114	6,099	3,188	5,023	487
Indigenous	26,430	3,080		76,484				
Equipment Hours	24,342	12,652	395	127,272	463	543	1,872	274
Tons of Fill	276,666	28,097		852,625		90		
Yards of Concrete	800			2,265	60	12.8		40
Acres Cleared	6.5	2.6		139.2				
Miles of Roads	0.4	0.3		10.4				0.6
Feet of Runway				3,000				
Vertical Const (sq ft)	4,950			14,830	4,800	960		
Laterite Placed (tons)		53,930		87,695				540
PSP Placed (sq ft)		111,950		560,018				
Taxiway (lin ft)		2,708		2,773				

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RECAPITULATION OF ENGINEER EFFORT

Through 30 April 1966

PROJECT

	SUB TOTAL ROK MARINE BRIGADE	Gp 35-117 My Ca Bridge Approaches	Route Maint Route QL-1	Route Maint My Ca Road	Route Recon Phan Rang to Ninh Hoa	SUB TOTAL BRIDGE & ROUTE	Gp 35-17-66 Crusher Headwall	Gp VOCO Phat Chi Recon
Man Hours	14,797	896	2,444	1,931	1,794	7,065	1,030	120
US Troops	14,797	896	2,444	1,931	1,794	7,065	1,030	120
Indigenous								
Equipment Hours	3,152	730	1,496	572	384	3,182	291	
Tons of Fill	90	2,745		80		2,825		
Yards of Concrete	112							
Acres Cleared								
Miles of Roads	0.6							
Feet of Runway								
Vertical Const (sq ft)	4,950							
Laterite Placed (tons)	540		1,851	981		2,832		
PSP Placed (sq ft)								
Taxiway (lin ft)								

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**REGULATION OF ENGINEER EFFORT**

Through 30 April 1966 **PROJECT**

	Bn Projects	Clavic Action	569th Topo Co Support	TOTAL				
Man Hours	11,931	410	10	394,991				
US Troops	11,931	410	10	318,507				
Indigenous				76,484				
Equipment Hours	1,908	140	8	135,673				
Tons of Fill	2,156			857,696				
Yards of Concrete				2,377				
Acres Cleared				139.2				
Miles of Roads				11				
Feet of Runway				3,000				
Vertical Const (sq ft)				19,780				
Laterite Placed (tons)				91,067				
PSP Placed (sq ft)	660			560,018				
Taxiway (lin ft)				2,773				

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EGA-3 (15 May 1966)

1st Ind

SUBJECT: Operational Report on Lessons Learned for Quarterly Period  
Ending 30 April 1966, Reports Control Symbol CSGPO-28 (RI))

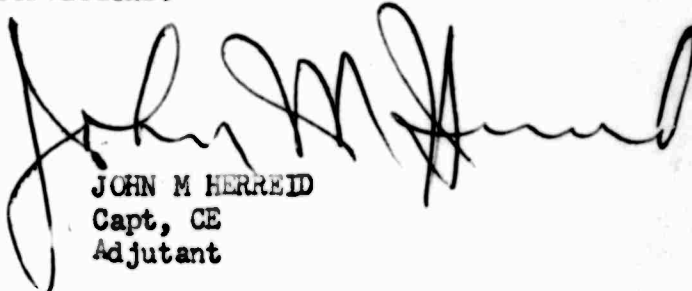
HEADQUARTERS, 35th Engineer Group (Construction), APO U.S. Forces 96312  
16 May 1966

TO: Commanding General, 18th Engineer Brigade, ATTN: AVEB-3, APO U.S.  
Forces 96307

1. In accordance with Department of the Army Regulation 525-24, dated 29 October 1959 and USARV Circular 870-1, dated 11 November 1965, with Change 1 dated 1 April 1966; Subject: Operational Report on Lessons Learned (RCS CSGPO-28 (RI)), the subject report is forwarded for the 20th Engineer Battalion (Combat) (Army).

2. Concur in Commanders Observations.

FOR THE COMMANDERS



JOHN M HERREID  
Capt, CE  
Adjutant

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AVEB-10

2nd Ind


SUBJECT: Operational Report on Lessons Learned for Period 1 Jan 66 - 30 Apr 66 (RCS CSGPO-28 (RI))

HEADQUARTERS, 18TH ENGINEER BRIGADE, APO US FORCES 96307, 7 June 1966

TO: Commanding General, United States Army, Vietnam, ATTN: AVC-HISTORY,  
APO US Forces 96307

Concur with commander's observations.

FOR THE COMMANDER:

  
ROBERT R. CONNOLLY  
Major, CE  
Adjutant

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*To Engr*

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AVC-DH (15 May 66)

3d Ind

SUBJECT: Operational Report on Lessons Learned for Quarterly Period  
Ending 30 April 1966, Reports Control Symbol CSGPO-28 (RL)

HEADQUARTERS, UNITED STATES ARMY, VIETNAM, APO San Francisco 96307 7 JUL 1966

THRU: Commander in Chief, United States Army, Pacific, ATTN: GPOC-MH,  
APO 96558

TO: Assistant Chief of Staff for Force Development, Department of the  
Army, Washington, D.C. 20310

This headquarters concurs with the 20th Engineer Battalion's Operational Report on Lessons Learned. This report is indicative of thorough research and complete records within the battalion.

FOR THE COMMANDER:

5 Incl  
nc

*for* *WR Antae*  
JAMES R. PERRY /LTABC  
Major, AGC  
Asst Adjutant General

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GPOP-MH (15 May 66)

4th Ind (FOUO)

SUBJECT: Operational Report on Lessons Learned for Period 1 Jan 66 -  
30 Apr 66 (RCS CSGPO-28 (R1)) (U)

HQ, U.S. ARMY, PACIFIC, APO San Francisco 96558 19 AUG 1966

TO: Assistant Chief of Staff for Force Development, Department of the  
Army, Washington D.C. 20310

1. The Operational Report on Lessons Learned of the 20th Engineer Battalion (Combat) for the period 1 January - 30 April 1966 is forwarded herewith. This is one of the best battalion-level ORLL's received by this headquarters. Problem areas are succinctly set forth and actions taken to remedy problems are carefully noted. The report reflects extensive research, sound thinking, and outstanding presentation. The attachment of significant supporting documents further enhances the value of the ORLL.

2. Section I, paragraph 2h, page 20, and Inclosure 4 to basic ORLL.

a. The MEDCAP program has proven invaluable for winning the confidence and cooperation of the local people, and often provides a base for other types of civic action endeavor. The continuing requirement for MEDCAP supplies is recognized.

b. Inclosure 4 to the ORLL and the committee method of implementing Civic Action plans as described in the cited paragraph constitute the best possible examples of effective Civic Action organization. Participation by local citizen representation from the planning and inception phases through final execution within the various categories of projects effectively fulfills the psychology of Civic Action.

c. The 20th Engineer Battalion has organized, planned, and achieved Civic Action objectives in an outstanding manner. The battalion's forward thinking has provided a point of departure for other U.S. Army units to continue support of Civic Action goals in the Cam Ranh Bay region.

3. Section II, paragraph 2, pages 24 - 25. It is duly noted that the 20th Engineer Battalion (Combat) has been assigned a construction mission. Force planning during CY 1965 recognized that the requirement for Engineer construction battalions in the RVN could not be met from available U.S. Army resources. DA, with the concurrence of this headquarters and HQ MACV, substituted Engineer combat battalions for part of the construction battalion requirement. In view of the difference in construction capability between the two types of battalions, construction support units such as Engineer light equipment and Engineer dump truck companies were provided to support the Engineer combat battalions. It is recognized

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GPOP-MH (15 May 66)

19 AUG 1966

SUBJECT: Operational Report on Lessons Learned for Period 1 Jan 66 -  
30 Apr 66 (RCS CSGPO-28 (R1)) (U)

that an Engineer combat battalion, even with specialized TOE units attached, cannot achieve the capability of an Engineer construction battalion. This situation will continue until requirements and capabilities can be matched.

4. Section II, paragraph 3, page 26.

a. Sub-paragraph a(2). On 25 May 1966, USARV recommended to DA that all engineer battalions scheduled for deployment to the RVN be authorized to carry a 90-day supply of repair parts. By message DA-775393, DTG 262202Z July 1966, to CONARC, DA raised the supply base from 15 to 30 days for items under paragraph 6-2, AR 735-25, and authorized 60 days supply for peculiar items.

b. Sub-paragraph b(1). On 19 May 1966, DA directed that all units deploying to the RVN be issued and carry as WABTOC TAT, on the basis of one per company, a 70-cubic-foot refrigerator and a 10-KW generator, together with 30 days supply of repair parts for both items. The 65-cubic-foot refrigerator will of necessity be issued until 70-cubic-foot refrigerators become available.

FOR THE COMMANDER IN CHIEF:



Copy furn:  
CG USARV, Attn: AVC-DH

D. A. HARRISON  
Capt, AGC  
Asst AG

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INDEXED  
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